Patent Claims

1. Composite component, in particular valve (10), having an inner component (14) and an outer component (12), which encloses the inner component (14) radially outwards, the inner component (14) being made at least radially outwards of a material with a first coefficient of thermal expansion (α_i) and the outer component (12) being made at least radially inwards of a material with a second coefficient of thermal expansion (α_a), which is smaller than the first coefficient of thermal expansion (α_i), the outer component (12) having at least one internal-diameter enlargement (22) radially inwards, facing the inner component (14), and the inner component (14) being fastened to the outer component (12), on the one hand by means of a press fit (52) and, on the other hand, by means of a positive engagement (54) which is formed by a thermally induced flow of the inner component (14) into the internal-diameter enlargement of the outer component (12).

2. Component according to Claim 1, characterised in that the outer component is a valve body (12).

3. Composite component according to Claim 2, characterised in that the valve body has an inner valve seat (50) and/or an outer valve seat (62).

4. Composite component according to Claim 3, characterised in that the valve (10) comprises a valve element (40) which cooperates with the inner valve seat (50).

5. Composite component according to Claim 4, characterised in that the valve (10) comprises an elastic element (42) which biases the valve element (40) against the inner valve seat (50).

6. Composite component according to Claim 5, characterised in that the inner component is a cage (14) and the elastic element (42) is supported, on the one hand, on the cage (14) and, on the other hand, on the valve element (40).

7. Composite component according to one of Claims 1 to 6, characterised in that the at least one internal-diameter enlargement (22) is enclosed at least partially by regions (24, 26) with a smaller internal diameter, in order to prevent accidental loosening of the positive-engagement connection between the inner component (14) and the outer component (12).

8. Composite component according to one of Claims 1 to 7, characterised in that the at least one internal-diameter enlargement (22) is a locally formed or fully circumferential groove (22) extending in the direction of the inner circumference of the outer component (12).

9. Composite component according to one of Claims 1 to 8, characterised in that the inner component (14) and/or the outer component (12) have a continuous contour in the circumferential direction.

10. Composite component according to one of Claims 1 to 9, characterised in that the inner component (14) and/or the outer component (12) are formed substantially cylindrically or in the shape of a ring.

11. Composite component according to one of Claims 1 to 10, characterised in that the inner component (14) and/or the outer component (12) have a substantially annular cross section.

12. Composite component according to one of Claims 1 to 11, characterised in that the inner component (14) is arranged coaxially with respect to the outer component (12).

13. Composite component according to one of Claims 1 to 12, characterised in that the inner component (14) is made of plastic at least radially outwards.

14. Composite component according to one of Claims 1 to 13, characterised in that the outer component (12) is made of metal at least radially inwards.

15. Method for the manufacture of a composite component, in particular a valve (10), by fastening an inner component (14) to an outer component (12) which encloses the inner component (14) radially outwards, the inner component (14) being made at least radially outwards of a material with a first coefficient of thermal expansion (α_i) and the outer component (12) being made at least radially inwards of a material with a second coefficient of thermal expansion (α_a), which is smaller than the first coefficient of thermal expansion (α_i), the outer component (12) having at least one internal-diameter enlargement (22) radially inwards, facing the inner component (14), comprising:
- connecting the two components (12, 14) by pressing the inner component (14) into the outer component (12), in order to form a press fit (52); and
- forming a positive engagement (54) by heating the connected components (12, 14), such that the inner component (14) flows at least locally into the internal-diameter enlargement (22) of the outer component (12).

16. Method according to Claim 15, characterised in that the heating of the two connected components (12, 14) in order to form the positive engagement (54) takes place when running-in the composite component (10).

17. Method according to Claim 16, characterised in that during the running-in temperatures of the composite component (10) in excess of 70°C are reached.

18. Method according to Claim 15, characterised in that the heating of the two connected components (12, 14) in order to form the positive engagement (54) takes place in a separate heating step before running-in the composite component (10).

19. Method according to one of Claims 15 to 18, characterised in that the application force is selected to be low enough, according to the materials of the components (12, 14), so that the press fit (52) is formed without causing damage.

20. Method according to one of Claims 15 to 19, characterised in that the application force is selected to be large enough, according to the materials of the two components (12, 14), so that a reliable press fit (52) is guaranteed in a temperature range of below 80°C.

21. Method according to one of Claims 15 to 20, characterised in that the material of the inner component (14) is selected so that the inner component (14) starts to fill the internal-diameter enlargement (22) of the outer component (12) at 70°C.

22. Method according to one of Claims 15 to 21, characterised in that the press fit (52) and the positive engagement (54) are formed in such a way that a reliable connection between the inner component (14) and the outer component (12) is guaranteed in a temperature range of from -40°C to 125°C.